



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,341	06/25/2003	Matthew O'Donnell	UOM 0274 PUSP	2637

22045 7590 03/29/2006

BROOKS KUSHMAN P.C.
1000 TOWN CENTER
TWENTY-SECOND FLOOR
SOUTHFIELD, MI 48075

EXAMINER

SHAY, DAVID M

ART UNIT PAPER NUMBER

3735

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/603,341

Applicant(s)

O'DONNELL, MATTHEW

Examiner

david shay

Art Unit

3735

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on December 27, 2005
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4-8, 11-15, 18-21, 23, 24, 27-29, 36 and 40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-8, 11-15, 18-21, 23, 24, 27-29, 36, and 40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

With regard to the enablement rejection of claim 5 applicant points to the portion of the disclosure that discusses the imparting of a substantially continuous force. However, applicant has not enablingly how to do so. It is noted that claim 28, reciting the structure for producing the uniform force has been cancelled. The examiner submits that without the enabling description of the structure for producing a continuous force, the step of applying such a force to the microbubble is similarly not enabled. Similarly, the mention that the microbubble “operates as a high frequency, high precision acoustic source” in the disclosure does not provide the disclosure necessary of the means by which to control and direct the shockwave so it “operates as a high frequency, high precision acoustic source”. Thus these arguments are not convincing, and the rejections have been maintained.

With regard to the indefiniteness rejection of claim 5, the manner in which a sinusoidally oscillating force, which passes through zero force as part of its oscillation, is a continuous force is unclear. With regard to claims 7 and 8 et cetera, it is not the recitation of the terms micro-Newtons and nano-Newtons, per se, but the range implied by use of the term “level” in conjunction with these recitations. For example, would a force of 5 GigaNewtons qualify as “a force in the micro-Newton level”, since a GigaNewton is merely 10^{19} microNewtons? The amended phrases are still unclear for the same reason. With regard to claim 14, applicant’s comment that nanobubbles are a subset of microbubbles is noted, however, this does not provide any meaningful information regarding the point at which a bubble ceases being a microbubble and is considered a nanobubble.

With regard to the art rejections, applicant argues that since the microbubble can eventually burst in the method of Kurtz, such method does not read on the claim. The examiner

Art Unit: 3739

must respectfully disagree. It is first noted that applicant's disclosure nowhere states that microbubbles discussed therein continue to exist until the end of time. There is only the disclosure that the bubbles are manipulated to some degree without being destroyed. Thus the primary embodiment alone of the method of Kurtz, wherein, "under the influence of the ultrasound beam 70 the gas in the cavitation nucleus 45 expands" (see column 4, lines 43-45), which is considered a manipulation of the microbubble, and after which the microbubble explodes.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "at least one laser pulse also creates at least one acoustic shock wave via LIOB wherein the at least one acoustic shock wave operates as a high frequency, high precision acoustic source" and the "means for measuring the elasticity of the material in contact with the microbubble based on the movement of the microbubble" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

Art Unit: 3739

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 5, 20, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The originally filed disclosure is silent on the manner in which "the ultrasound wave exerts a substantially continuous force at the surface of the microbubble"; the "at least one laser pulse also creates at least one acoustic shock wave via LIOB wherein the at least one acoustic shock wave operates as a high frequency, high precision acoustic source"; and the "means for measuring the elasticity of the material in contact with the microbubble based on the movement of the microbubble".

Claims 3, 5, 7, 8, 28, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 28 are indefinite as the exact meaning of the term "substantially continuous force" is unclear, as the very nature of acoustic or ultrasonic waves is to exert an undulating force. Claim 7 is indefinite as the exact meaning of the term "a force in the nano-Newton to micro-Newton level" is unclear. Claim 8 is indefinite as the exact

Art Unit: 3739

meaning of the term "a force in the nano-Newton to micro-Newton level" is unclear. Claims 14 and 36 are indefinite as the exact meaning of the term "nanobubble" and how this differs from a microbubble is unclear.

Claims 1, 2, 4-8, 11, 13-15, 18-21, 23, 24, 27-29, 36, and 40 are rejected under 35

U.S.C. 102(e) as being clearly anticipated by Kurtz et al.

See column 2, line 35 to column 6, line 56, wherein the laser pulse of Kurtz et al is about the length of the instant laser pulse, and thus the bubbles will be of about the same size, since this is the controlling factor for bubble size, as taught by Kurtz et al; the acoustic force of 74 MPa will exert forces in the claimed ranges on an object that has a radius on the order of microns or nanometers; and the pulse repetition rate of the laser of Kurtz et al will cause a laser pulse to enter the material while the cavitation bubble from the previous pulse still exists, and thus will result in light being refracted by the bubble; and the ultrasound source is pulsed for 2.5 milliseconds, yielding a pulsed force, and a force which is substantially continuous for the 2.5 milliseconds

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozkan et al in combination with Kurtz et al. Ozkan et al teaches a method of cell patterning. Kurtz et al teach manipulating tissue using microbubbles. It would have been obvious to the artisan or ordinary skill to employ the microbubble method of Kurtz et al in the patterning of Ozkan et al since the method of Kurtz et al does not require that charges be induced on the items to be patterned, or to employ patterning in the method of Kurtz et al, since the method of Kurtz can be used for any purposes, as taught by Kurtz et al, and in either case to measure the elasticity of the material, since this provides no unexpected result, and is well within the scope of one having ordinary skill in the art, thus producing a device and method such as claimed.

Applicant's arguments filed December 27, 2005 have been fully considered but they are not persuasive. The arguments are not persuasive for the reasons set forth above.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

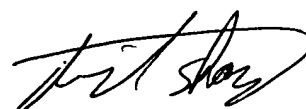
Any inquiry concerning this communication or earlier communications from the examiner should be directed to david shay whose telephone number is (571) 272-4773. The examiner can normally be reached on Tuesday through Friday from 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patricia Bianco, can be reached on Monday through Friday. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 3739

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "David M. Shay", with a stylized, flowing script.

DAVID M. SHAY
PRIMARY EXAMINER
GROUP 330